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54 Men's hand made Signet Ring. Tarnish Proof mounting. White gold color effect.

50 Ladies' Basket Mounting. Nice size center simulated diamond.

51 Ladies' large square cut stone. Stone comes in all colors. State color.

4a Friendship Ring, solid sterling silver in the smart, popular Sweetheart design.

52 Baby Ring. 10 K Solid Yellow Gold.

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7a Love & Friendship Ring. Solid sterling silver with 2 hearts linked. Beautifully engraved. Forget-me-not!

8a Child's Ring set with simulated stone. White or yellow gold color effect.

49 Ladies' single brilliant stone. Hard to tell from genuine diamond. Tiffany style high mounting.

10a Child's Signet Ring. Yellow or white gold color effect.

11a Wedding Ring. Raised or flared design. White gold or yellow color effect, or sterling silver mounting.

12a Men's Ring set with single brilliant simulated diamond. White gold color effect.

15a Ladies' Solitaire Ring with simulated diamond in square mounting. Yellow or white gold color effect.

14a Ladies' Solitaire Ring. Large center simulated diamond with smaller stones.

15a Men's Ring set with twin simulated 2 diamonds. White gold color effect.

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22a Ladies Solitaire engagement ring. Extra large brilliant simulated diamond. Yellow or white gold color effect

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27a Men's Military Ring—U. S. Army insignia—*Heavy Solid Sterling Silver* or yellow gold color. Massive design.

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29a Men's Military Ring—Air Corps insignia—*Solid Sterling Silver*—Massive design.

57 Hand Carved Coroza Nut Ring—Indian Head.

31a Men's Military Ring—U. S. Marines insignia—Massive design in yellow gold color effect and Sterling silver

32a Men's Military Ring—U. S. Navy insignia—*Solid Sterling Silver*—Massive design.

33a Large center simulated Ladies' Solitaire Ring Diamond—2 smaller sized stones. Yellow or white gold color effect mounting.

58 Indian Head Ring. Head is stamped in gold leaf.

35a Men's Medium Signet Ring. White Gold color effect mounting.

36a Ladies' Dinner Ring with large, unusually clear, brilliant simulated diamond or colored stone in center surrounded by smaller stones. White gold color effect.

37 Love & Friendship Ring. Hearts design also used as Wedding Ring. Yellow or white gold color effect, or sterling silver

38a Ladies' Solitaire Ring. Center stone is genuine diamond chip. Solid Sterling Silver mounting.

39a Ladies' Solitaire Ring. 2 sparkling simulated diamonds. White gold color effect mounting.

40a Men's Signet Ring, also for boys. White or yellow gold color effect mounting.

41a Ladies' Solitaire Ring with large center simulated diamond and 6 smaller stones. Yellow or white gold color effect mounting.

42a Hand Clasp Love & Friendship ring. Rings come apart to form 2 rings. Made of sterling silver.

43a Ladies' Wedding Band 7 large brilliant simulated diamonds. White or yellow gold color effect mounting, or sterling silver.

44a Men's Wedding Ring. Yellow or white gold color effect or sterling silver.

45a Coroza Nut Ring. Hand carved from the nut of the Coroza Palm. Head polished to a beautiful ebony black and set with simulated pearl. These rings are highly prized by the natives of Puerto Rico. There's a legend that Good Luck Always Follows The Wearer.

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47a Men's ring with square cut simulated garnet. Yellow or white gold color effect mounting.

48a Wedding Band Set with sparkling simulated diamonds. White or yellow gold color effect mounting, or sterling silver.

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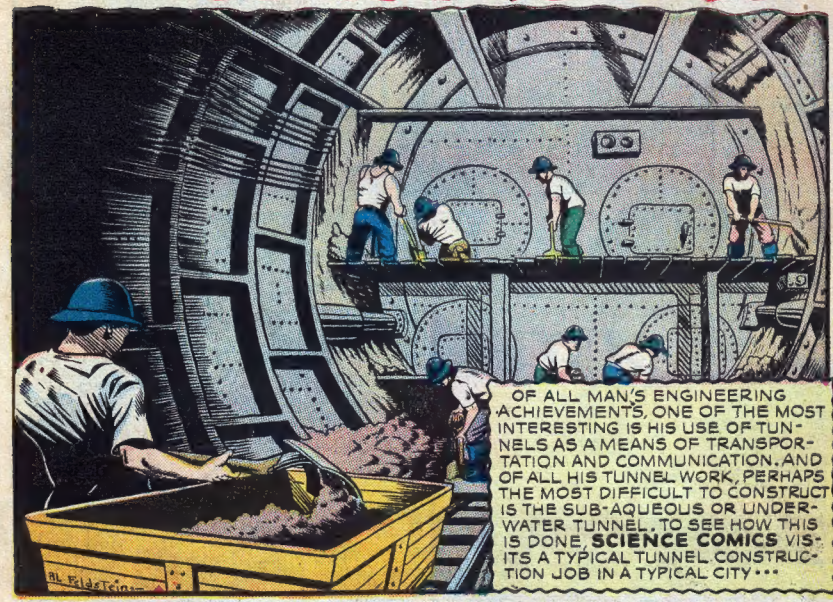
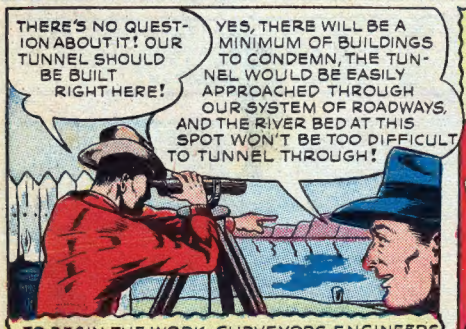
HOW TUNNELS ARE CONSTRUCTED

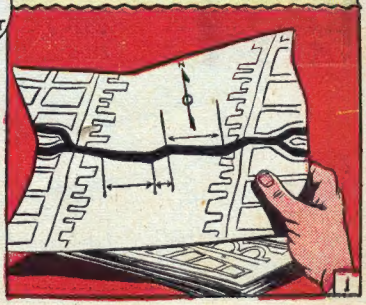


OF ALL MAN'S ENGINEERING ACHIEVEMENTS, ONE OF THE MOST INTERESTING IS HIS USE OF TUNNELS AS A MEANS OF TRANSPORTATION AND COMMUNICATION. AND OF ALL HIS TUNNEL WORK, PERHAPS THE MOST DIFFICULT TO CONSTRUCT IS THE SUB-AQUEOUS OR UNDERWATER TUNNEL. TO SEE HOW THIS IS DONE, **SCIENCE COMICS** VISITS A TYPICAL TUNNEL CONSTRUCTION JOB IN A TYPICAL CITY...

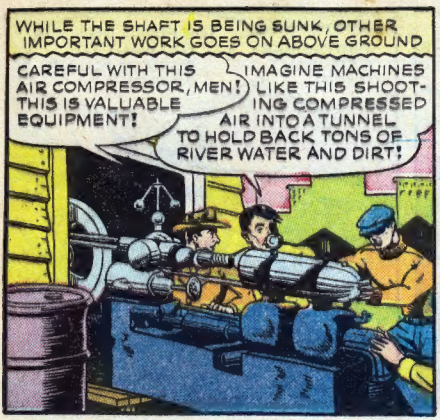

THERE'S NO QUESTION ABOUT IT! OUR TUNNEL SHOULD BE BUILT RIGHT HERE!
YES, THERE WILL BE A MINIMUM OF BUILDINGS TO CONDEMN, THE TUNNEL WOULD BE EASILY APPROACHED THROUGH OUR SYSTEM OF ROADWAYS, AND THE RIVER BED AT THIS SPOT WON'T BE TOO DIFFICULT TO TUNNEL THROUGH!

TO BEGIN THE WORK, SURVEYORS, ENGINEERS DRAFTSMEN, COST ACCOUNTANTS AND OTHERS DRAW UP A SET OF PLANS WHICH ARE SUBMITTED TO THE PROPER CIVIC AUTHORITIES FOR FINAL APPROVAL!

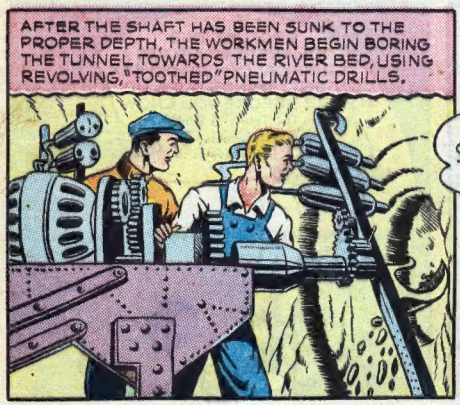
AFTER CHANGES HAVE BEEN MADE IN THE ORIGINAL PROPOSED PLANS, A FINAL SET OF DRAWINGS AND BLUE PRINTS ARE DRAWN UP AND THE ACTUAL DIGGING AND CONSTRUCTION WORK BEGINS!

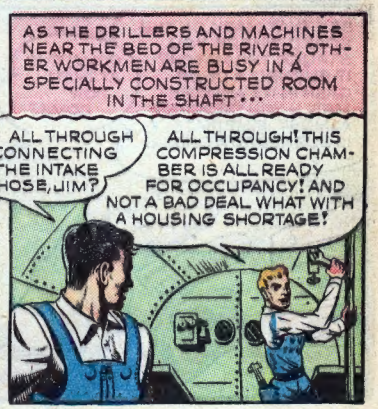


I THOUGHT THIS WAS GOING TO BE AN UNDER-WATER TUNNEL! HOW COME WE'RE WORKING UP HERE ON DRY LAND ?
SO THIS IS YOUR FIRST TUNNEL JOB? WELL, WE'RE GOING TO SINK A SHAFT DOWN THROUGH THE GROUND AND START THE TUNNEL ON LAND!
THE SHAFT IS SUNK STRAIGHT DOWN INTO THE EARTH. THAT GIVES US SOME ELBOW ROOM, THEN WE GET MEN AND EQUIPMENT TO THE BOTTOM OF THE SHAFT AND START SHOVING THE TUNNEL UNDER THE RIVER BED!
WE KNOW WHAT THE RIVER BED IS COMPOSED OF-AND CLAY, SAND, SILT, AND EVEN ROCK AREN'T TOO TOUGH FOR OUR MEN AND MACHINES!
HOW DO WE KNOW WE'LL BE ABLE TO GET THE TUNNEL THROUGH EVEN AFTER WE START IT?
THERE ARE THREE WAYS TO DIG AN UNDERWATER TUNNEL: WITH COMPRESSED AIR, WITH A STEEL SHIELD, OR WITH BOTH AIR AND A SHIELD! WE'RE GOING TO USE BOTH OF THEM!
I HEAR WE'RE GOING TO USE COMPRESSED AIR IN THE TUNNEL ··· AND A STEEL SHIELD IN FRONT OF US AS WE PUSH THROUGH!
TYPICAL CROSS-SECTION OF UNDERWATER TUNNEL, SHOWING ARRANGEMENT OF SHAFTS, SLOPE OF TUNNEL, AND VARIOUS TYPES OF STRATA THROUGH WHICH THE TUNNEL MUST BE DRILLED. TUNNELS ARE STARTED FROM BOTH SIDES OF THE RIVER, EVENTUALLY MEETING ABOUT IN THE CENTER!
2


WHILE THE SHAFT IS BEING SUNK, OTHER IMPORTANT WORK GOES ON ABOVE GROUND
CAREFUL WITH THIS AIR COMPRESSOR, MEN! THIS IS VALUABLE EQUIPMENT!
IMAGINE MACHINES LIKE THIS SHOOTING COMPRESSED AIR INTO A TUNNEL TO HOLD BACK TONS OF RIVER WATER AND DIRT!

NATURALLY! WE'VE GOT TO BE ABLE TO REGULATE THE PRESSURE OURSELVES! AFTER ALL, THE LIVES OF ALL THOSE SANDHOGS IN THE TUNNEL DEPEND ON US!
SURE! AND THEY'RE ALL RUN FROM RIGHT HERE AT OUR OWN PRIVATE POWERHOUSE!


AFTER THE SHAFT HAS BEEN SUNK TO THE PROPER DEPTH, THE WORKMEN BEGIN BORING THE TUNNEL TOWARDS THE RIVER BED, USING REVOLVING, "TOOTHED" PNEUMATIC DRILLS.


AS THE DRILLERS AND MACHINES NEAR THE BED OF THE RIVER, OTHER WORKMEN ARE BUSY IN A SPECIALLY CONSTRUCTED ROOM IN THE SHAFT ···
ALL THROUGH CONNECTING THE INTAKE HOSE, JIM?
ALL THROUGH! THIS COMPRESSION CHAMBER IS ALL READY FOR OCCUPANCY! AND NOT A BAD DEAL WHAT WITH A HOUSING SHORTAGE!

SANDHOGS ARE SENT THROUGH THE CHAMBER WHERE AIR PRESSURE IS GRADUALLY INCREASED TO ACCUSTOM THEIR BODIES TO THE PRESSURE THEY WILL ENCOUNTER WHEN THEY ENTER THE TUNNEL!

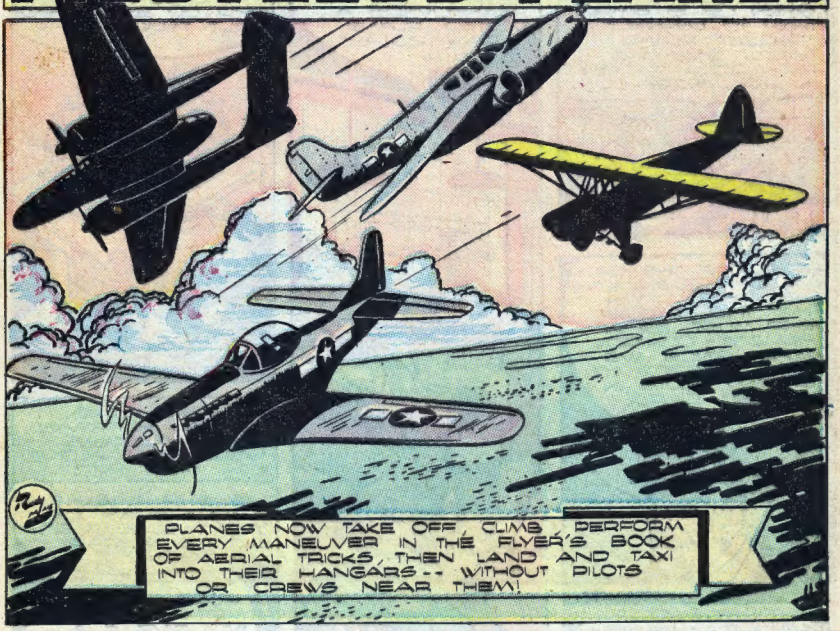
WHEN WE LEAVE THE TUNNEL AFTER WORK, THIS CHAMBER WILL DECOMPRESS OUR BODIES GRADUALLY - SO WE CAN AVOID GETTING THE "BENDS"!

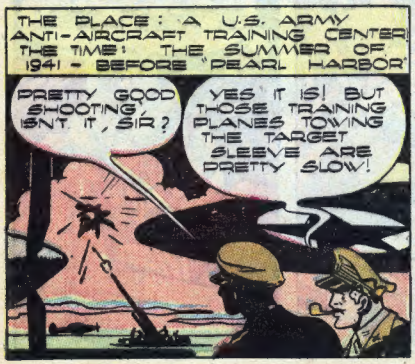
WITH THE TUNNEL NOW SEVERAL HUNDRED FEET INTO THE RIVER BED, THE MEN ARE NOW WORKING IN COMPRESSED AIR AND WITH THE STEEL SHIELD AT THE HEADING ···
THEY'RE MOVING THE SHIELD AHEAD AGAIN! WE'VE GOT A COUPLE OF MINUTES TO RELAX!
HEY! PUT THAT CIGARETTE AND THOSE MATCHES AWAY!
WHY? A CIGARETTE WON'T HURT!
YOU FOOL! DO YOU WANT TO BURN US ALL UP IN HERE?
SEE THAT MARK ON THE BOARD WHERE YOU STRUCK THE MATCH? IT BURNED A DEEP GASH IN IT! AND THE MATCH YOU DROPPED ALMOST IMMEDIATELY IS BURNED TO A CINDER!
GOLLY, IT IS AT THAT! HOW COME?
BECAUSE THIS COMPRESSED AIR HAS A TERRIFICALLY HIGH OXYGEN CONTENT! THINGS BURN UP IN HERE BEFORE YOU KNOW IT! THAT'S WHY WE CALL IT "HIGH AIR"!
HEY, MUCKERS! GET YOUR MUCK TRUCK UP HERE!
LET'S GO! THE HOGS ARE CALLING AGAIN!
THOSE STEEL SHIELDS ARE HANDY GADGETS TO HAVE IN FRONT OF YOU, ALL RIGHT!
THOSE DOORS BUILT INTO IT ARE HANDY, TOO! ALL YOU HAVE TO DO IS OPEN THEM TO SCOOP OUT THE MUCK IN FRONT OF THE SHIELD!

ALL RIGHT, FELLOWS! START THE HYDRAULIC JACKS! LET'S SHOVE THAT SHIELD UP AGAIN!
I'D SURE HATE TO HAVE TO MOVE THAT THING BY HAND! BUT THESE JACKS DO IT EASILY!
HM! BETTER CHECK THAT AIR PRESSURE IN HERE! SILT'S DROPPING FROM THE ROOF!
THAT'S SOMETHING I COULD NEVER FIGURE! WHAT'S THE AIR PRESSURE GOT TO DO WITH IT?
WE ALWAYS TRY TO KEEP A LITTLE LESS AIR PRESSURE ON THE INSIDE OF THE TUNNEL THAN THE HYDRO-STATIC PRESSURE - OR RIVER PRESSURE - IS ON THE OUTSIDE! IF WE DON'T, THE HIGHER PRESSURE IN HERE CAUSES THE SILT OF THE RIVER TO DRY AND FALL FROM THE ROOF; THEN THE RIVER COMES IN AND WE'RE GONERS!
AND THEN THE MOST DREADED CRY TO THE TUNNEL WORKERS ECHOES DOWN THE LINE!
IT'S A BLOW! IT'S A BLOW!
EVERYBODY UP THERE! WE HAVE TO PLUG THOSE HOLES!
GRAB RAGS, MUD, BOARDS --- ANYTHING YOU CAN FIND! IF WE CAN'T STOP IT, MAKE A BREAK FOR THE EMERGENCY AIR LOCK WHEN I GIVE YOU THE SIGNAL!
WE'RE LICKING IT, BOSS!
GOOD WORK, MEN! THE DANGER'S ABOUT OVER NOW!

THAT WAS A CLOSE ONE, BELIEVE ME! AND IT HAPPENED JUST AS I WAS TELLING YOU WHAT MIGHT HAPPEN!
IN THIS CASE, WITH LESS PRESSURE IN HERE, THE RIVER MIGHT HAVE BROKEN THROUGH AND FLOODED THE TUNNEL. BUT IF THERE HAD BEEN A BREAK WHEN WE HAD TOO MUCH PRESSURE HERE, WE'D HAVE BEEN BLOWN RIGHT UP THROUGH THE RIVER!
THE DANGER NOW OVER, THE IRON GANG RESUMES ITS WORK OF LINING THE TUNNEL WITH CAST IRON WALLS AS THE SHIELD AGAIN MOVES FORWARD!
LATER, THE STEEL SHIELD IS REMOVED AND A GREAT MOMENT ARRIVES AS THE TWO HALVES OF THE TUNNEL MEET!
CONGRATULATIONS, PETE! WE'VE HIT IT RIGHT ON THE NOSE!
YES, SIR! AND TWO DAYS AHEAD OF SCHEDULE, TOO!
WITH THE WORK OF THE SANDHOGS BROUGHT TO A SUCCESSFUL CONCLUSION, VENTILATING EQUIPMENT IS INSTALLED, THE ROADWAY PAVED, AND THE WALLS OF THE TUNNEL LINED WITH INDIRECT LIGHTING EQUIPMENT AND GLEAMING TILES FOR BETTER VISIBILITY!
FINALLY, THE INGENUITY OF MAN COMPLETES ANOTHER LINK IN HIS SYSTEM OF COMMUNICATION AND TRANSPORTATION AS ANOTHER TRIUMPH OF SCIENTIFIC PLANNING AND EXECUTION IS PUT INTO USEFUL, DAY-AND-NIGHT SERVICE!
6

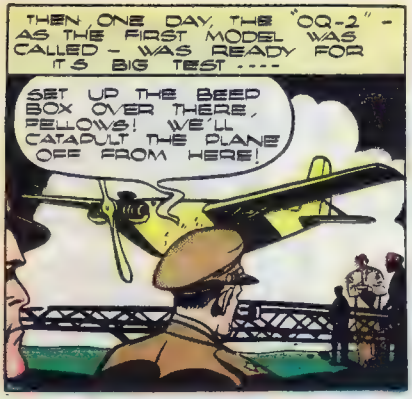
PILOTLESS PLANES

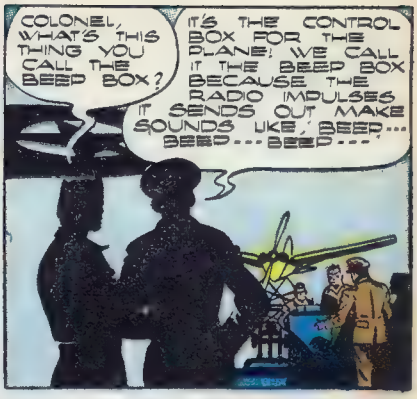

PLANES NOW TAKE OFF, CLIMB, PERFORM EVERY MANEUVER IN THE FLYER'S BOOK OF AERIAL TRICKS, THEN LAND AND TAXI INTO THEIR HANGARS -- WITHOUT PILOTS OR CREWS NEAR THEM!


THE PLACE: A U.S. ARMY ANTI-AIRCRAFT TRAINING CENTER! THE TIME: THE SUMMER OF 1941 - BEFORE "PEARL HARBOR"
PRETTY GOOD SHOOTING, ISN'T IT, SIR?
YES, IT IS! BUT THOSE TRAINING PLANES TOWING THE TARGET SLEEVE ARE PRETTY SLOW!

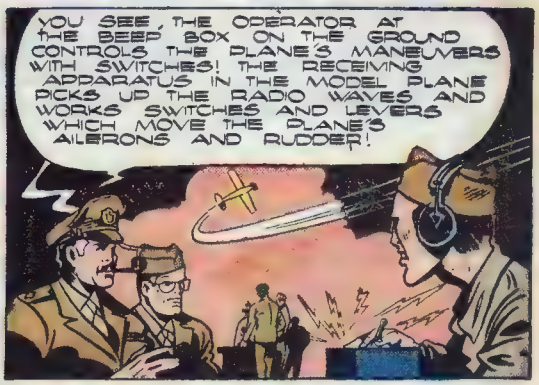
THAT'S TRUE OF COURSE! THE TARGET SLEEVE IS MOVING ALONG A STRAIGHT COURSE! BUT WHAT ELSE CAN WE USE?
I DON'T KNOW! BUT I'M GOING TO GIVE THE ARMY ENGINEERS AT WRIGHT FIELD A CHANCE TO TACKLE THE PROBLEM!

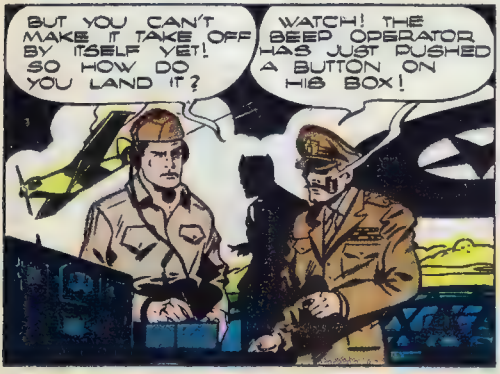
SHORTLY AFTER, AT THE WRIGHT FIELD (OHIO) EQUIPMENT LABORATORY, LIEUTENANT COLONEL L.D. HUFFMAN MET WITH THE KEY MEN OF HIS STAFF!
THE PROBLEM THEY'VE GIVEN US IS SIMPLY THIS: TO PERFECT A TARGET PLANE THAT'LL GIVE THE ANTI-AIRCRAFT CREWS A REAL WORK-OUT!
1
RIGHT OFF THE BAT, WE CAN BEGIN WITH THE ASSUMPTION THAT THIS TARGET SHIP MUST BE A REMOTE-CONTROL TYPE, SINCE WE CAN'T AFFORD TO EXPEND PILOTS IN TARGET SHIPS!
2
SIR, WE ALREADY KNOW THAT WE CAN CONTROL MODEL PLANES BY RADIO WAVES! WHY NOT WORK IN THAT DIRECTION?
EXACTLY WHAT I HAD IN MIND, CAPTAIN!
3
HOWEVER, ALL THE RADIO-CONTROLLED MODEL PLANES WE HAVE TODAY CAN ONLY PERFORM A FEW MANEUVERS! THEY CAN'T TAKE OFF, LAND, OR DO ANY OF THE INTRICATE AERIAL MANEUVERS A PILOTED PLANE CAN DO!
4
LET'S START PLANNING OUR OWN MODEL PLANE NOW, WITH THE THOUGHT IN MIND OF GRADUALLY ADDING CONTROL UNITS TO IT SO THAT EVENTUALLY, WE'LL BE ABLE TO MAKE OUR TARGET SHIP DO EVERYTHING BUT TALK!
5
BEFORE LONG, COLONEL HUFFMAN AND HIS STAFF WERE WELL ALONG WITH THEIR MODEL!
THIS SHIP WILL HAVE A WING SPAN OF ONLY TWELVE FEET, BUT IT'S A START ANYHOW!
THE EIGHT-HORSEPOWER MOTOR, THOUGH, WILL GIVE IT A SPEED OF ABOUT 125 MILES PER HR.
6

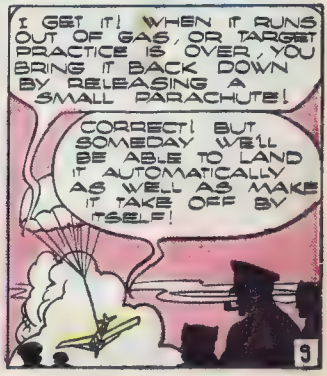

THEN ONE DAY, THE "OQ-2" - AS THE FIRST MODEL WAS CALLED - WAS READY FOR IT'S BIG TEST ----
SET UP THE BEEP BOX OVER THERE, FELLOWS! WE'LL CATAPULT THE PLANE OFF FROM HERE!


COLONEL, WHAT'S THIS THING YOU CALL THE BEEP BOX?
IT'S THE CONTROL BOX FOR THE PLANE! WE CALL IT THE BEEP BOX BECAUSE THE RADIO IMPULSES IT SENDS OUT MAKE SOUNDS LIKE, BEEP... BEEP---BEEP---

SHE'S OFF!
I WANT TO WATCH THIS!

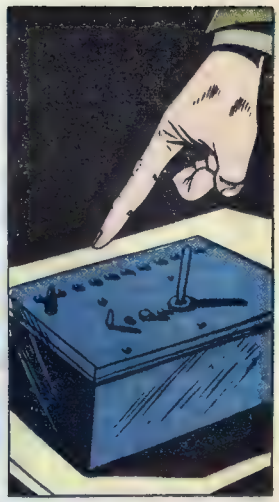

YOU SEE, THE OPERATOR AT THE BEEP BOX ON THE GROUND CONTROLS THE PLANE'S MANEUVERS WITH SWITCHES! THE RECEIVING APPARATUS IN THE MODEL PLANE PICKS UP THE RADIO WAVES AND WORKS SWITCHES AND LEVERS WHICH MOVE THE PLANE'S AILERONS AND RUDDER!

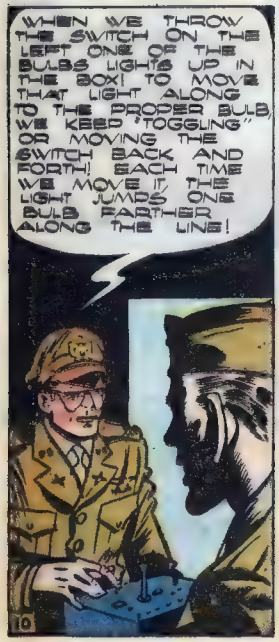

BUT YOU CAN'T MAKE IT TAKE OFF BY ITSELF YET! SO HOW DO YOU LAND IT?
WATCH! THE BEEP OPERATOR HAS JUST PUSHED A BUTTON ON HIS BOX!

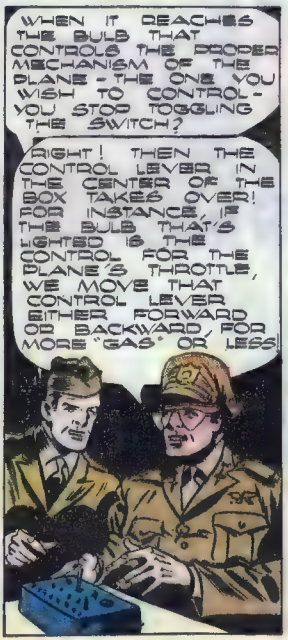

I GET IT! WHEN IT RUNS OUT OF GAS, OR TARGET PRACTICE IS OVER, YOU BRING IT BACK DOWN BY RELEASING A SMALL PARACHUTE!
CORRECT! BUT SOMEDAY WE'LL BE ABLE TO LAND IT AUTOMATICALLY AS WELL AS MAKE IT TAKE OFF BY ITSELF!

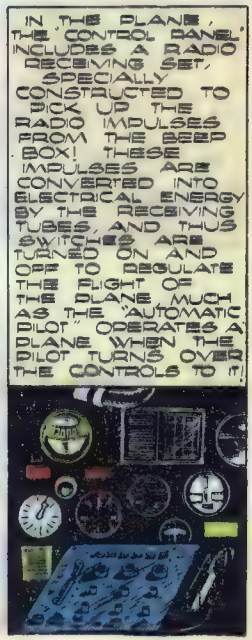
AFTER MANY MONTHS OF EXPERIMENTATION AND IMPROVEMENTS, THE WRIGHT FIELD ENGINEERS WERE READY TO TEST THEIR FIRST, LARGE PLANE!
HOW'S THE BEEP BOX PERFORMING?
SEEMS TO BE RIGHT TUNE, SIR!

TELL ME, COLONEL, JUST HOW DOES THIS NEW BEEP BOX OF YOURS WORK?
IT CAN BE OPERATED ON THE GROUND OR IN THE AIR FROM ANOTHER PLANE! HERE, I'LL SHOW YOU WHAT IT LOOKS LIKE AND HOW IT WORKS!




WHEN WE THROW THE SWITCH ON THE LEFT ONE OF THE BULBS LIGHTS UP IN THE BOX! TO MOVE THAT LIGHT ALONG TO THE PROPER BULB WE KEEP "TOGGLING" OR MOVING THE SWITCH BACK AND FORTH! EACH TIME WE MOVE IT THE LIGHT JUMPS ONE BULB FARTHER ALONG THE LINE!
10


WHEN IT REACHES THE BULB THAT CONTROLS THE PROPER MECHANISM OF THE PLANE - THE ONE YOU WISH TO CONTROL - YOU STOP TOGGLING THE SWITCH?
RIGHT! THEN THE CONTROL LEVER IN THE CENTER OF THE BOX TAKES OVER! FOR INSTANCE, IF THE BULB THAT'S LIGHTED IS THE CONTROL FOR THE PLANE'S THROTTLE, WE MOVE THAT CONTROL LEVER EITHER FORWARD OR BACKWARD, FOR MORE "GAS" OR LESS!


IN THE PLANE, THE CONTROL PANEL INCLUDES A RADIO RECEIVING SET, SPECIALLY CONSTRUCTED TO PICK UP THE RADIO IMPULSES FROM THE BEEP BOX! THESE IMPULSES ARE CONVERTED INTO ELECTRICAL ENERGY BY THE RECEIVING TUBES, AND THUS SWITCHES ARE TURNED ON AND OFF TO REGULATE THE FLIGHT OF THE PLANE, MUCH AS THE "AUTOMATIC PILOT" OPERATES A PLANE WHEN THE PILOT TURNS OVER THE CONTROLS TO IT!

THE SUCCESS OF THE PILOTLESS PLANE WAS PROVED BEYOND QUESTION! IT WAS SOON APPLIED TO OTHER AVIATION DEVELOPMENTS!

ISN'T THAT A BEAUTY? THAT'S THE NEW BELL D-59 JET PROPULSION PLANE!

I WONDER HOW SHE'LL ACT IN THE AIR... WE'RE STILL PRETTY MUCH IN THE EXPERIMENTAL STAGE WITH THESE JET JOBS!

WELL, NO TEST PILOT WILL HAVE TO RISK HIS LIFE TO FIND OUT! WE'VE GOT HER EQUIPPED WITH RADIO CONTROLS!

I SHOULD HAVE NOTICED THAT BEEP BOX ON THE GROUND OVER THERE!

IN ADDITION TO FLIGHT TESTING NEW PLANES, THE RADIO CONTROL APPARATUS MAY SOON HAVE EVEN MORE IMPORTANT PEACETIME USES! FOR EXAMPLE--

CARGO PLANES ABOUT LOADED NOW?

YES, SIR! YOU CAN TAKE OFF ANY MINUTE NOW!

MOVING

OKAY! LET'S GET GOING! I'LL CHECK CONTROL TOWER!

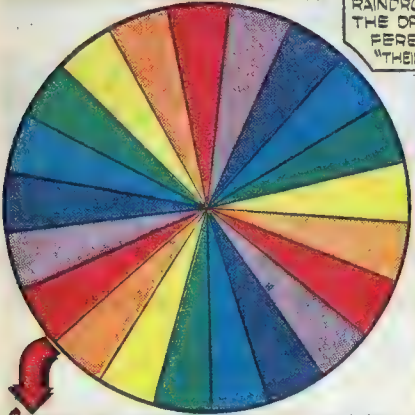
THE "MOTHER SHIP" CONTAINING THE PILOT AND THE RADIO CONTROL "BEEP BOX", NOW CIRCLES ABOVE AND AUTOMATICALLY BRINGS THE PILOTLESS CARGO PLANES INTO THE AIR!

IN THIS MANNER WHOLE SQUADRONS OF PILOTLESS SHIPS CAN BE FLOWN FROM POINT TO POINT ACROSS THE COUNTRY, DROPPING OFF EACH CARGO SHIP AT SPECIFIED LANDING FIELDS WHILE THE REST ON THE FLIGHT CONTINUES THUS, ONE PILOT CAN CONTROL A WHOLE CROSS-COUNTRY FLIGHT OF MANY PLANES!

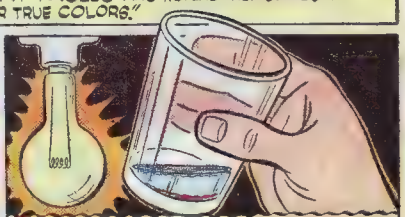
HOME SCIENCE EXPERIMENTS WITH COLOR

ALTHOUGH ALL COLORS CAN BE PRODUCED FROM A COMBINATION OF RED, YELLOW, BLUE AND BLACK, THERE ARE REALLY SEVEN BASIC COLORS. YOU CAN REMEMBER THEM BY THINKING OF A MAN'S NAME: ROY G. BIV.

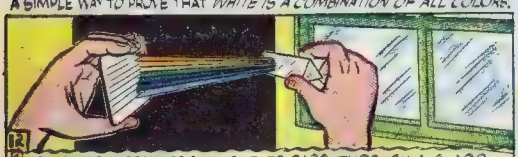
YOU CAN SEE SEVEN COLORS BY OBSERVING A RAINBOW. WHEN THE LIGHT FROM THE SUN STRIKES RAINDROPS, LIGHT WAVES PASSING THROUGH THE DROPS ARE DIVERTED AT SLIGHTLY DIFFERENT ANGLES AND REVEAL THEMSELVES IN "THEIR TRUE COLORS."



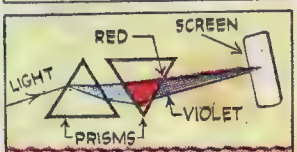
CUT OUT AND MOUNT THE CIRCLE ON A PIECE OF CARDBOARD, PLACE A PIN THROUGH THE CENTER AND SPIN THE CIRCLE SWIFTLY. NOTE THAT THE SEVEN COLORS BLEND TOGETHER TO FORM SOLID WHITE. THIS IS A SIMPLE WAY TO PROVE THAT *WHITE IS A COMBINATION OF ALL COLORS.*



YOU CAN BREAK UP WHITE LIGHT BY MAKING A WATER PRISM FROM AN ORDINARY DRINKING GLASS FILLED WITH A SMALL AMOUNT OF WATER. SIGHT THROUGH THE TUMBLER, AS SHOWN, AT A BRIGHT LIGHT. YOU WILL SEE A THIN LINE OF VIOLET AT THE TOP, A THIN LINE OF RED AT THE BOTTOM. THESE ARE THE TWO EXTREMES OF THE COLOR SPECTRUM.



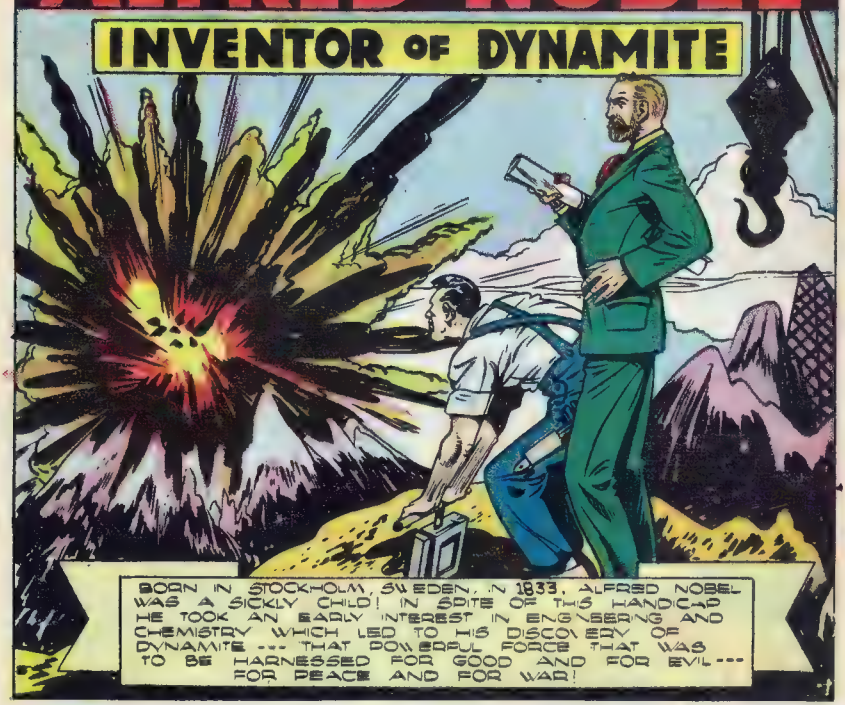
BY ALLOWING A BEAM OF SUNLIGHT TO PASS THROUGH A GLASS PRISM (A GLASS PENDANT FROM A CHANDELIER WILL SERVE THE SAME PURPOSE) AND CAPTURING THE RAYS ON A WHITE CARD, YOU WILL BE ABLE TO SEE THE SEVEN COLORS OF THE SPECTRUM VERY EASILY. IN PASSING THROUGH THE PRISM, THE SEVEN RAYS OF LIGHT ARE BENT AT SLIGHTLY DIFFERENT ANGLES AND EMERGE IN THE SEVEN COLORS OF THE SPECTRUM.



BY CAUSING THE LIGHT TO PASS THROUGH A SECOND PRISM BEFORE FALLING ON THE CARD YOU CAN BEND THE LIGHT WAVES BACK TO THEIR ORIGINAL POSITIONS AND THE RESULT FALLING ON A SCREEN OR CARD AS BEFORE IS NOW PURE WHITE LIGHT AGAIN.

ALFRED NOBEL

INVENTOR OF DYNAMITE



BORN IN STOCKHOLM, SWEDEN, IN 1833, ALFRED NOBEL WAS A SICKLY CHILD! IN SPITE OF THIS HANDICAP HE TOOK AN EARLY INTEREST IN ENGINEERING AND CHEMISTRY WHICH LED TO HIS DISCOVERY OF DYNAMITE --- THAT POWERFUL FORCE THAT WAS TO BE HARNESSED FOR GOOD AND FOR EVIL --- FOR PEACE AND FOR WAR!

AS A BOY NOBEL LIVED IN ST. PETERSBURG, RUSSIA, WHERE HIS FATHER MANUFACTURED MUNITIONS FOR THE CZAR!

I LIKE RUSSIA BUT SOME DAY I HOPE TO GO BACK TO SWEDEN AND BUILD A FACTORY THERE!

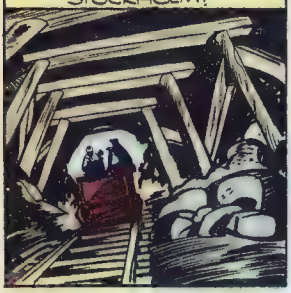
AS A YOUTH NOBEL STUDIED ENGINEERING IN THE U.S.A. AND RETURNED TO EURODE WHEN HE WAS TWENTY-ONE!

WHY ARE WE GOING BACK TO SWEDEN, FATHER?

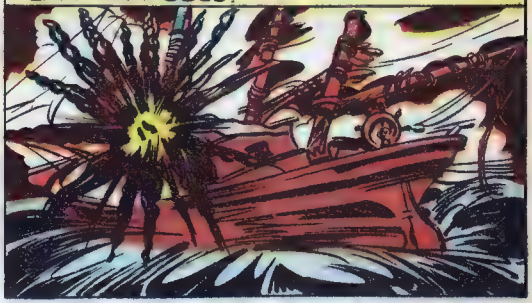
TO BUILD THE WORLD'S FIRST COMMERCIAL NITROGLYCERINE PLANT!

JUST HOW DO YOU MAKE NITROGLYCERINE COMMERCIALLY, ALFRED?
WE COMBINE GLYCERINE (WHICH IS MADE FROM ANIMAL AND VEGETABLE FATS) WITH SULPHURIC AND NITRIC ACIDS!
THE MIXTURE IS THEN POURED INTO COLD WATER, THE HEAVY NITROGLYCERINE SINKING TO THE BOTTOM WHERE IT IS DRAINED OFF!
IT SOUNDS SIMPLE, ALFRED! SINCE YOU HAVE NO COMPETITION YOU SHOULD BECOME RICH!
THE TROUBLE IS THAT NITRO-GLYCERINE IS VERY DANGEROUS TO HANDLE!
YOU SEE, NITRO IS SO SENSITIVE THAT A SLIGHT JAR COULD SET IT OFF, AND WHEN IT CHANGES TO A GAS IT HAS 10,000 TIMES THE VOLUME IT HAS AS A LIQUID!
IN 1864, TRAGEDY STRUCK THE NOBEL FAMILY! THE NITRO WORKS EXPLODED KILLING NOBEL'S YOUNGER BROTHER, EMIL!
14
NOBEL'S FATHER WAS PROSTRATED AT THE NEWS! HE SUFFERED A STROKE AND BECAME CRIPPLED PERMANENTLY!
THE SWEDISH GOVERNMENT FORBADE NOBEL TO MANUFACTURE NITRO ON ITS SOIL! UNDAUNTED, YOUNG ALFRED BUILT A NEW FACTORY ON A BARGE MOORED IN A LAKE!
I MUST KEEP TRYING UNTIL I FIND A SAFER WAY TO HANDLE NITRO!

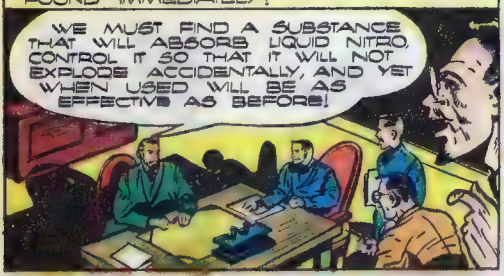
NOBEL GOT GOING COMMERCIALLY! THE SWEDISH GOVERNMENT USED HIS NITRO TO BLAST A TERMINAL RAILWAY UNDER STOCKHOLM!



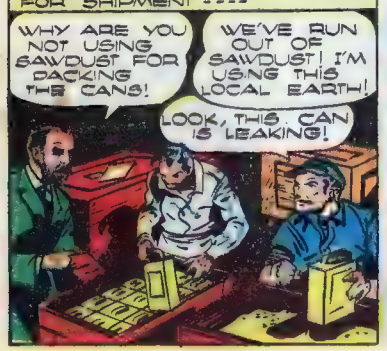
NOBEL BUILT PLANTS IN FOUR COUNTRIES, BUT MISFORTUNE RETURNED! HIS NORWEGIAN PLANT EXPLODED, A SHIP CARRYING NITRO BLEW UP NEAR PANAMA AND NITRO CAUSED DEATH AND DESTRUCTION IN SAN FRANCISCO!



NOBEL BECAME DESPERATE! A SAFE WAY TO HANDLE NITRO HAD TO BE FOUND IMMEDIATELY!


WE MUST FIND A SUBSTANCE THAT WILL ABSORB LIQUID NITRO, CONTROL IT SO THAT IT WILL NOT EXPLODE ACCIDENTALLY, AND YET WHEN USED WILL BE AS EFFECTIVE AS BEFORE!

ONE DAY AS WORKMEN IN THE GERMAN PLANT WERE PACKING CANS OF NITRO FOR SHIPMENT ----


WHY ARE YOU NOT USING SAWDUST FOR PACKING THE CANS!
WE'VE RUN OUT OF SAWDUST! I'M USING THIS LOCAL EARTH!
LOOK, THIS CAN IS LEAKING!

ALL THE NITRO HAS LEAKED OUT OF THE CAN, YET THERE IS NOT A DROP ON THE TABLE, OR EVEN SEEPING THROUGH THE BOX! THE EARTH MUST HAVE ABSORBED IT!

NOBEL THOROUGHLY TESTED THE LOCAL EARTH, CALLED KIESELGUHR!

KIESELGUHR CONTAINS ABOUT 95% SILICIA, IS INERT, NON-COMBUSTIBLE, KNEADS LIKE DOUGH, AND ABSORBS LARGE QUANTITIES OF NITRO! IT SHOULD MAKE A GOOD BASE FOR THE LIQUID!

MIXING THREE PARTS NITRO AND ONE PART KIESELGUHR, NOBEL ROLLED THE PASTE INTO A CYLINDER, PUTTING A PERCUSSION CAP AND A FUSE ON ONE END!

WHAT IMPROVEMENT IS THE IMPRISONED NITRO OVER THE LIQUID FORM?

COME, I WILL SHOW YOU!

USING A HAMMER ON THE NITRO IN THE ROCK JUST CAUSES A NOISE, BECAUSE ONLY THE PART OF THE LIQUID ACTUALLY STRUCK EXPLODED AS THE NITRO WAS NOT CONFINED OR HEATED!

BANG

NOW I LIGHT THE FUSE OF THE CYLINDER OF NITRO CONFINED IN THE KIESELGUHR! THE LIGHTED FUSE CAUSES HEAT WHICH WILL EXPLODE THE CAP WHICH DETONATES THE NITRO!

BOOM

EXPLOSION OCCURRED WHEN 350° OF HEAT WAS APPLIED TO THE IMPRISONED NITRO, CHANGING IT INTO GASES (WHICH DEMANDED THOUSANDS OF TIMES ITS ORIGINAL VOLUME) WITH SUCH FORCE AND SPEED THAT ANYTHING BLOCKING ITS WAY WAS BLASTED ALONG!

NOBEL PATENTED THE PRODUCT IN 1866, CALLING IT DYNAMITE AFTER THE GREEK WORD DYNAMIS, MEANING POWER!

DYNAMITE IS SAFER THAN CANNED NITRO, BECAUSE BEING A SOLID, WILL TAKE LONGER TO CHANGE INTO GASES, WHILE ITS SOFTNESS ENABLES IT TO STAND ACCIDENTAL BLOWS BETTER!

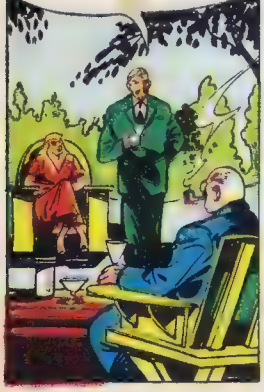
THERE WERE TWO FLAWS IN DYNAMITE: (1) IT FROZE EASILY (40°F) (2) IT DETERIORATED IN WATER! THE GLYCERINE, BEFORE MIXING WITH THE ACID, WAS THEN HEATED TO 300° C, SPLITTING OFF WATER, WHICH LOWERED THE FREEZING POINT!

THIS L.F. (LOW FREEZING) DYNAMITE IS BETTER THAN THE OTHERS FOR WINTER WORK!

FIGHTING NATIONS PROMPTLY TOOK NOBEL'S DYNAMITE AND WITH IT PERFECTED NEW INSTRUMENTS OF DESTRUCTION!

NOBEL FELT BADLY THAT DYNAMITE WAS BEING USED AS AN AGENT FOR DEATH!

HAD I KNOWN THAT DYNAMITE WAS GOING TO BE USED FOR KILLING PEOPLE I NEVER WOULD HAVE INVENTED IT!



ON HIS DEATH BED, NOBEL CALLED FOR HIS LAWYER!

I WANT TO LEAVE MY FORTUNE IN YEARLY PRIZES FOR EMINENCE IN MEDICINE, CHEMISTRY, PHYSICAL SCIENCE, LITERATURE AND WORKING FOR PEACE!

THE 1945 NOBEL PRIZE HAS BEEN AWARDED TO CORDELL HULL, SECRETARY OF STATE UNDER THE LATE FRANKLIN D. ROOSEVELT

AND THUS, THE MONEY ACCUMULATED BY DYNAMITE AND USED IN KILLINGS IN WAR, IS USED TO BRING ABOUT A BETTER AND LASTING PEACE!

Science And

By Joseph

DURING the war, a great deal was heard from business and industry concerning their plans for the post-war world of peace. Scores of advertisements by various branches of industry proclaimed that the lessons learned and the definite advances made in design, production, use of new materials, etc., for war production presaged a variety of wonderful surprises for the average person once the war was over and won.

There were many people who scoffed at what seemed to be extravagant claims made by some manufacturers, but with each passing day and week and month we are beginning to see more and more of the wonders we were promised.

Now, with the concrete evidence of scientific advances made during the war becoming apparent to nearly everyone, it is safe to conclude that most of the reputable businessmen, industrialists and their associates were not merely talking through their hats.

In the field of plastics, for example, many wonderful products have emerged from the war years. The plexiglas bomber turrets are one instance. During the war, this transparent substance (shatterproof) protected our airmen during their thousands of missions through enemy flak and bullets.

Now, with reconversion, this same plexiglas is saving human lives in another way. The great adaptability of this plastic enables it to be formed in many different sizes and shapes. For one thing, it is being used as oxygen tent material in the hospitals. In another way, it is used to house insects and bugs for scientists to study their ways of life and thus bring them under control.

In addition, plexiglas is being used to make transparent articles of furniture to enhance the beauty of our homes and offices. Even shower baths are being equipped with perfectly fitting sections of plexiglas which are watertight and—naturally—waterproof.

In the field of electronics, we are only beginning to see the results of scientific research which advanced so speedily under the impetus of necessity. Great strides were made in the perfection of television. The Westinghouse Company, in a recent announcement, speculated on the possibility of using giant transport-type planes to act as "re-televisors" of television programs. Under this plan, the planes, flying at about 10,000 feet, would pick up a televised program from a ground or master station and then transmit the program back again to earth. In this way, the program could be picked up by receiving sets over a greater area than is possible with transmission from atop towers on the ground. In fact, the Westinghouse people estimate that only fourteen planes would need to be aloft across the United States at one time in order to "cover" about 79 per cent of the U. S. population.

THERE are some authorities who believe this to be an impractical plan. Others, like Glenn L. Martin, builder of some of our biggest planes, believes—like Westinghouse—that the idea is workable and sound. The Martin Company is already at work designing and building the special type of plane necessary for this revolutionary approach to television.

Another technical advance that augurs great things is the announcement that television in full color has already been accomplished—on a small scale, to be sure, and not over a great distance—but the important thing is that it has been done. Of course, this raises the question of what will happen to the standard television sets now in use

The Federal Communications Commission, which keeps an eye peeled towards developments like full color television, may cause the major companies like the National Broadcasting Company, Columbia Broadcasting Sys-

The Future

Blair

tem, Mutual and the comparative newcomers like Du Mont, to proceed more slowly than had been hoped to make full color television an every-day reality. However, it has arrived and needs only time and encouragement from government to swing it into full-scale, big-time operation.

In speaking of these newest scientific achievements, we must not overlook such things as the quick-freezing of food stuffs which is now an accepted reality in many parts of the country. Home freezers are already in operation in many homes, and there are community deep-freeze lockers in many towns and cities where each family may rent space to store his own frozen foods. Foods frozen and preserved in this way will last indefinitely and among other advantages, they will save the householder many dollars a year by enabling him to purchase foods when in season (and therefore usually cheaper than at other times of the year when hot house foods replace them)

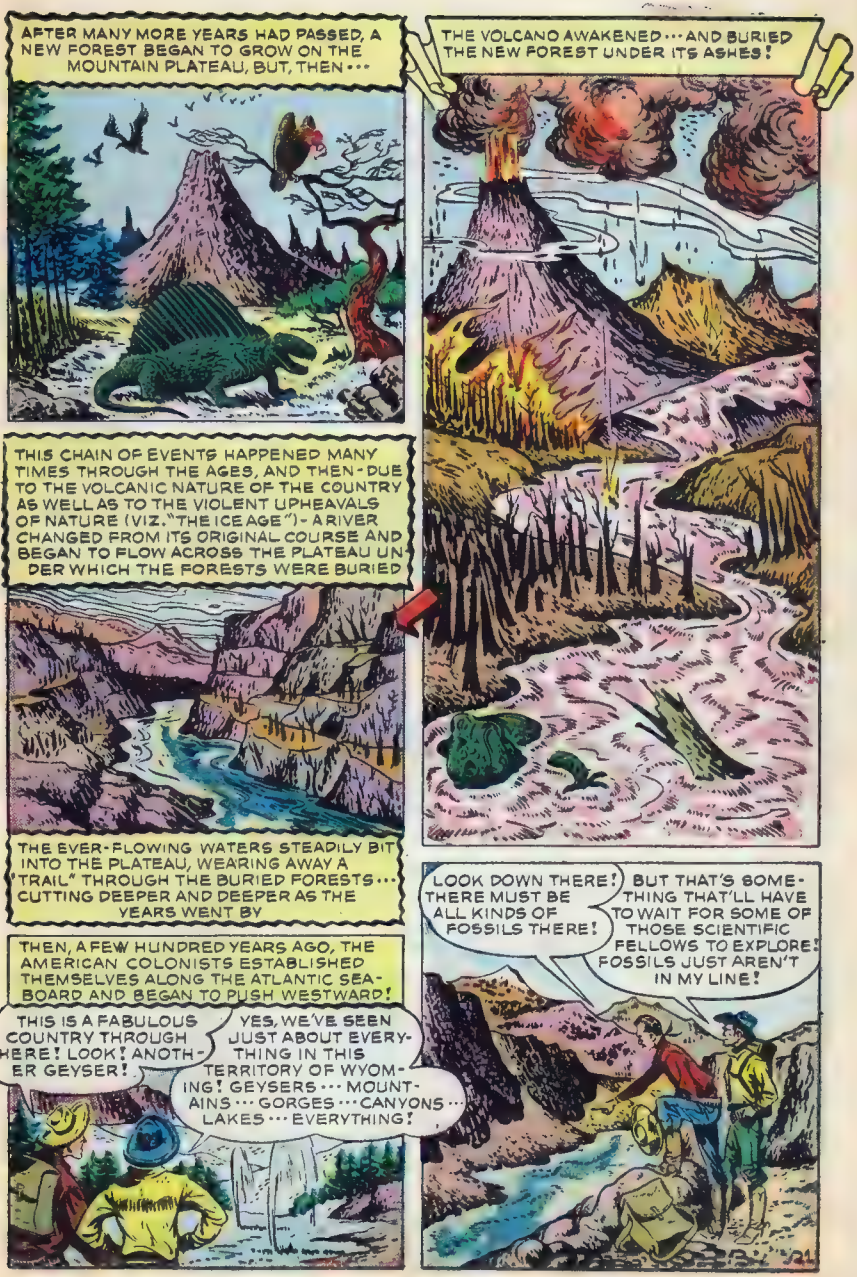
Another war development, as we all know, was in the field of synthetics—notably rubber. Here, we were faced with a problem that had to be met and solved practically immediately, for the Japs after Pearl Harbor quickly snatched up nearly all of our sources of natural rubber. That our scientists came through again is a tribute to American inventive genius and resourcefulness. Now, with the war won and our nation again in possession of the rubber-producing plantations in the Pacific, there is no reason to believe that our great catalyst-cracking plants which helped so much in the production of synthetic rubber during the war will at once become obsolete. On the contrary, with American production of automobiles in full swing (which it will be before many more months have passed) the increased need for tires and other rubber products will probably require large-scale production of synthetic rubber for some time to come; if, indeed, it does not continue indefinitely for many years.

STILL another front of science saw amazing development during the war. This concerned the wood-working industries which turned out bonded-resin plywood with amazing tensile strength—some sample testing as high as steel in resistive strength. Much of this plywood went into the construction of planes and gliders and proved highly satisfactory from a performance standpoint.

While these things were happening, the paint and chemical industries were far from idle. The basic ingredients for varnish and shellac, normally imported from China and surrounding areas, were under Jap control. But chemical engineers and research workers went right ahead developing substitutes that are eminently qualified to take their places with the standard types so long in use. Then, too, certain oils normally brought in from South America could no longer be had for paints, due to the shipping shortage. But American scientists licked this problem, too, and our battleships and other weapons received their protective coatings of paint right on schedule. As a result of the necessity of developing substitute oils, etc., for these paints, we have today many new kinds of paints (for example, one kind of paint used on concrete will actually outlast the concrete itself!) that are vast improvements over the old ones.

We have only touched on a very few of the things that came out of this war due to the work of our scientists. The list is too long for mention here, for there was Radar and Radio-Telephone communication, rocket bombs and jet-propelled planes, etc. But in conclusion, it is hardly necessary to say that the near future will bring many more wonders to light, all born in the brains of our great American scientists, and destined to make our way of life more pleasant and enjoyable.

THE PETRIFIED FOREST
MILLIONS OF YEARS AGO, IN WHAT IS NOW THE YELLOWSTONE NATIONAL PARK (IN THE STATE OF WYOMING), A VOLCANO ERUPTED SENDING A SHOWER OF MOLTEN ASHES INTO A FOREST...
DOC
SOON, THE FOREST WAS ALMOST COMPLETELY COVERED WITH VOLCANIC ASHES, AS WERE THE HAPLESS ANIMALS WHICH WERE TRAPPED IN THE WHITE-HOT FLOW!
20
AS THE YEARS ROLLED BY, THE VOLCANO BECAME INACTIVE - "WENT TO SLEEP" - AFTER COMPLETELY BURYING THE FOREST UNDER MILLIONS OF TONS OF ASHES!

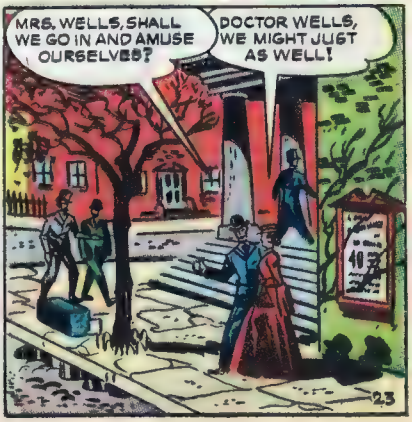

AFTER MANY MORE YEARS HAD PASSED, A NEW FOREST BEGAN TO GROW ON THE MOUNTAIN PLATEAU, BUT, THEN···
THE VOLCANO AWAKENED··· AND BURIED THE NEW FOREST UNDER ITS ASHES!
THIS CHAIN OF EVENTS HAPPENED MANY TIMES THROUGH THE AGES, AND THEN - DUE TO THE VOLCANIC NATURE OF THE COUNTRY AS WELL AS TO THE VIOLENT UPHEAVALS OF NATURE (VIZ. "THE ICE AGE") - A RIVER CHANGED FROM ITS ORIGINAL COURSE AND BEGAN TO FLOW ACROSS THE PLATEAU UNDER WHICH THE FORESTS WERE BURIED
THE EVER-FLOWING WATERS STEADILY BIT INTO THE PLATEAU, WEARING AWAY A "TRAIL" THROUGH THE BURIED FORESTS··· CUTTING DEEPER AND DEEPER AS THE YEARS WENT BY
THEN, A FEW HUNDRED YEARS AGO, THE AMERICAN COLONISTS ESTABLISHED THEMSELVES ALONG THE ATLANTIC SEABOARD AND BEGAN TO PUSH WESTWARD!
THIS IS A FABULOUS COUNTRY THROUGH HERE! LOOK! ANOTHER GEYSER!
YES, WE'VE SEEN JUST ABOUT EVERYTHING IN THIS TERRITORY OF WYOMING! GEYSERS··· MOUNTAINS··· GORGES··· CANYONS··· LAKES··· EVERYTHING!
LOOK DOWN THERE! THERE MUST BE ALL KINDS OF FOSSILS THERE!
BUT THAT'S SOMETHING THAT'LL HAVE TO WAIT FOR SOME OF THOSE SCIENTIFIC FELLOWS TO EXPLORE! FOSSILS JUST AREN'T IN MY LINE!

THE PIONEERS PUSHED ON ··· THE TERRITORY OF WYOMING BECAME THE STATE OF WYOMING, AND ITS EXTREME NORTHWESTERN COUNTY WAS SET ASIDE AS A NATIONAL PARK!
WHAT IN TARNATION IS ALL THE DIGGING ABOUT, STRANGER?
WE'RE EXCAVATING THE CANYON AND PLATEAU HERE IN ORDER TO BETTER EXPOSE THE PETRIFIED ORGANIC MATTER IMBEDDED HERE! THIS IS ONE OF THE FINEST EXAMPLES OF PETRIFICATION I'VE EVER SEEN!
WHAT IN TUNKET IS "PETRIFICATION," ANYHOW?
WELL, AFTER THESE FORESTS WERE BURIED, WATER SEEPED THROUGH THE EARTH, CARRYING MINERALS WITH IT! THESE MINERALIZED WATER PARTICLES GRADUALLY REPLACED THE ORGANIC PARTICLES THAT MADE UP THE TREES' STRUCTURE, UNTIL NOW ALL THAT IS LEFT OF THE ORIGINAL TREES ARE THEIR FORMS!
WELL, HOW COME THIS PARTICULAR SPOT TURNED INTO STONE INSTEAD OF INTO COAL?
COAL IS FORMED IN MUCH THE SAME WAY, BUT WITH A DIFFERENT COMBINATION OF MINERALS, PLUS THE FACT THAT · WHEN COAL IS FORMED · IT IS LARGELY BECAUSE ORGANIC MATTER HAS PARTIALLY DECAYED BEFORE THE ELEMENTS 'CHANGE THEM INTO STONE'.
ALTHOUGH THE PETRIFIED FOREST OF THE YELLOWSTONE IS BY FAR THE MOST FAMOUS, THERE ARE SEVERAL OTHER EXAMPLES TO BE FOUND IN OTHER SPOTS, SUCH AS THE GRAND CANYON NATIONAL PARK, IN ARIZONA.
YELLOWSTONE PARK
WYOMING
CHEYENNE

THE CONQUEST OF PAIN

FOR CENTURIES, THE HUMAN RACE ENDURED THE SUFFERING AND PAIN OF SURGERY, DENTAL WORK, ETC. WITHOUT DOING - OR TRYING TO DO! - ANYTHING ABOUT IT! BUT ONE HUNDRED YEARS AGO, A YOUNG CONNECTICUT DENTIST, HORACE WELLS, SAW A P.T. BARNUM SIDE SHOW... AND TURNED WHAT HE SAW INTO "THE GREATEST SINGLE GIFT EVER MADE TO SUFFERING HUMANITY"- ANESTHESIA!
Doc

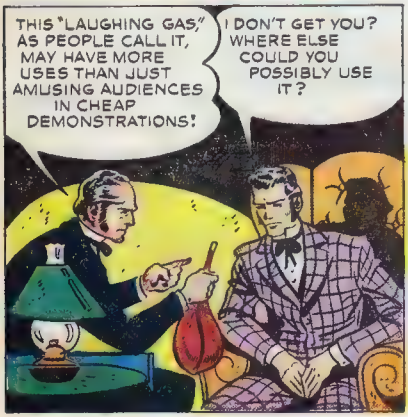
DECEMBER 10, 1844 - OUTSIDE UNION HALL, HARTFORD, CONNECTICUT ...
A GRAND EXHIBITION OF LAUGHING GAS!
40 GALLONS OF THE GAS WILL BE PREPARED AND ADMINISTERED TO ALL IN THE AUDIENCE WHO DESIRE TO INHALE IT..

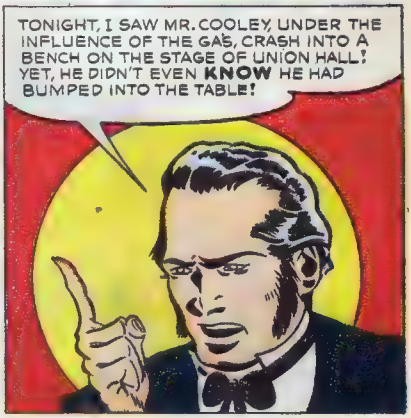


LADIES AND GENTLEMEN, THESE INFLATED RUBBER BAGS CONTAIN THE WONDROUS GAS, NITROUS OXIDE! ALL WHO WISH TO INHALE IT, STEP UPON THE STAGE!
I'LL TRY IT! AS LONG AS IT DOESN'T COST ANYTHING!
MY, MY! I NEVER THOUGHT MR. COOLEY HAD ENOUGH NERVE!
JUST INHALE DEEPLY AND RELAX!
THAT ISN'T HARD FOR ME TO DO!
A FEW MINUTES LATER···
YIPPEE! I'M AN INDIAN!
WHOOOOOPS!
WHEW! HE KICKED HIS SHINS AGAINST THAT TABLE HARD ENOUGH TO LACERATE THE SKIN! YET HE'S LAUGHING!
HA HA HA HA !
AFTER THE "DEMONSTRATION"
DIDN'T YOU HURT YOURSELF WHEN YOU RAN INTO THAT TABLE?
TABLE? WHAT TABLE? I DON'T REMEMBER RUNNING INTO ANYTHING!
HMM! I'M GOING TO GET SOME OF THAT NITROUS OXIDE AND TRY IT OUT IN A DENTAL EXTRACTION
24

LATER THAT NIGHT, DR. JOHN RIGGS - A FORMER STUDENT - ARRIVED AT WELLS' HOME
GREAT SCOT, HORACE! IS ANYTHING WRONG?
NO, JOHN! I SENT WORD TO HAVE YOU COME OVER FOR A LITTLE CHAT!

A CHAT? ABOUT WHAT?
ABOUT THIS LITTLE RUBBER BAG OF NITROUS OXIDE! SIT DOWN, JOHN, AND LET ME TELL YOU WHAT I HAVE IN MIND!


THIS "LAUGHING GAS," AS PEOPLE CALL IT, MAY HAVE MORE USES THAN JUST AMUSING AUDIENCES IN CHEAP DEMONSTRATIONS!
I DON'T GET YOU? WHERE ELSE COULD YOU POSSIBLY USE IT?


TONIGHT, I SAW MR. COOLEY, UNDER THE INFLUENCE OF THE GAS, CRASH INTO A BENCH ON THE STAGE OF UNION HALL! YET, HE DIDN'T EVEN **KNOW** HE HAD BUMPED INTO THE TABLE!

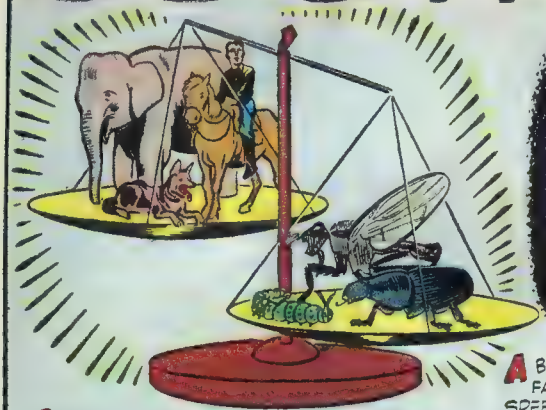
I'M GOING TO TRY A TOOTH EXTRACTION, WITH THE PATIENT UNDER THE INFLUENCE OF NITROUS OXIDE!
THAT'S A GREAT IDEA! BUT WILL THE PATIENT GET VIOLENT? WILL WE BE ABLE TO FIND ANYONE WILLING TO TRY IT? AND BESIDES, DO YOU THINK IT'S RIGHT TO ASK ANYONE TO TRY IT?

I'VE ALREADY WORKED THOSE PROBLEMS OUT! YOU'RE GOING TO PERFORM THE EXTRACTION! AND I'M GOING TO BE THE PATIENT! AGREED?
YOU BET IT IS! YOU MAY HAVE HIT ON SOMETHING THAT'LL ELIMINATE THE PAIN OF OPERATIONS FOR ALL TIME!

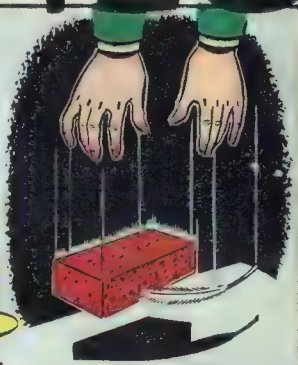
THE NEXT MORNING IN WELLS' OFFICE • • •
GENTLEMEN, DR. RIGGS AND I HAVE INVITED YOU HERE TO WITNESS AN UNUSUAL EXPERIMENT! WE ARE GOING TO ATTEMPT A TOOTH EXTRACTION USING NITROUS OXIDE GAS!
WELLS, I THINK YOU MUST BE INSANE!
THERE WILL NEVER BE SUCH A THING AS PAINLESS DENTISTRY!
THAT REMAINS TO BE SEEN! DR. RIGGS, ARE YOU READY?
LEAVE THE OFFICE DOOR OPEN SO WE CAN DASH OUT IF HE GETS VIOLENT!
LOOK! HIS FACE IS GETTING PALE! EVEN A LITTLE BIT BLUE!
HE LOOKS LIKE HE'S IN A TRANCE!
PLEASE BE QUIET, GENTLEMEN! I'M GOING TO REMOVE THE TOOTH NOW!
IT'S OUT! AND THERE WASN'T A SIGN OF PAIN FROM DR. WELLS!
INCREDIBLE!
AMAZING!
HOW DO YOU FEEL, WELLS?
HE'LL BE FINE AS SOON AS THE EFFECTS OF THE GAS WEAR OFF!
GENTLEMEN, THIS IS A NEW ERA IN TOOTH PULLING! IT DID NOT HURT ME AT ALL!
THUS, ON DECEMBER 11th, 1844 - AT TEN O'CLOCK IN THE MORNING - THE FIRST SUCCESSFUL USE OF AN ANESTHETIC WAS DEMONSTRATED!

SOON, HORACE WELLS' FAME SPREAD, AND HE WENT TO BOSTON, WHERE HE PREPARED TO DEMONSTRATE HIS METHODS BEFORE A DISTINGUISHED AUDIENCE OF DENTISTS, SURGEONS, AND MEDICAL STUDENTS!
THERE YOU ARE, GENTLEMEN! ABSOLUTELY NO PAIN!
BUT AT THAT MOMENT, AN UNFORTUNATE THING OCCURRED··· THE PATIENT GROANED!
WHAT? I CAN'T UNDERSTAND IT! MAYBE I DIDN'T GIVE HIM ENOUGH GAS!
HA! HA!
IT'S A HUMBUG!
YOU'VE FAILED, WELLS!
I'VE PERFORMED A SCORE OF EXTRACTIONS WITHOUT HAVING THIS HAPPEN! WHAT WENT WRONG, DR. MORTON?
NEVER MIND, HORACE! I'M CONVINCED THAT IT'S A SOUND IDEA! I'M GOING TO WORK ON IT MYSELF!
BUT WELLS HAD NOT FAILED! YEARS LATER IT WAS PROVED THAT PATIENTS MIGHT GROAN, SCREAM, OR SHOUT WITHOUT ACTUALLY FEELING ANY PAIN! AND AFTER WELLS' DEATH, IN 1846, DR. W.G.T. MORTON AND OTHERS CARRIED ON THE GREAT WORK!
OLIVER WENDELL HOLMES, THE GREAT AMERICAN POET, PHYSICIAN AND HUMORIST, GAVE THE NAME "ANESTHESIA" TO THE STATE OF BEING UNDER THE INFLUENCE OF PAIN-KILLING AGENTS, AND MEN OF SCIENCE WENT ON TO DEVELOP AND USE SUCH ANESTHETICS AS ETHER, COCAINE, ETC. TODAY, ALL HUMANITY OWES A GREAT DEBT TO THE VISION OF DOCTOR HORACE WELLS!

SCIENCE ODDITIES

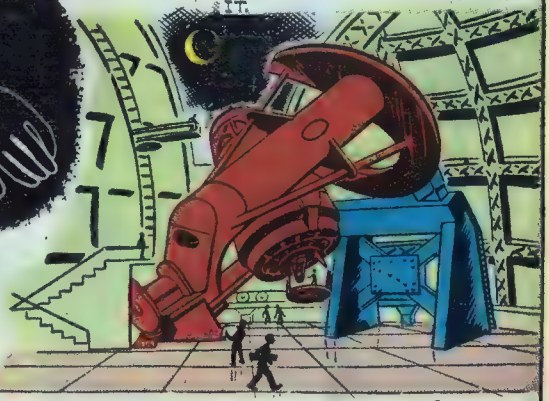


ALTHOUGH IT TAKES MANY HUNDREDS OF INSECTS TO EQUAL THE WEIGHT OF THE AVERAGE ANIMAL, YET THE COMBINED WEIGHT OF ALL THE INSECTS IN THE WORLD IS GREATER THAN ALL THE LAND ANIMALS, **INCLUDING HUMAN BEINGS**

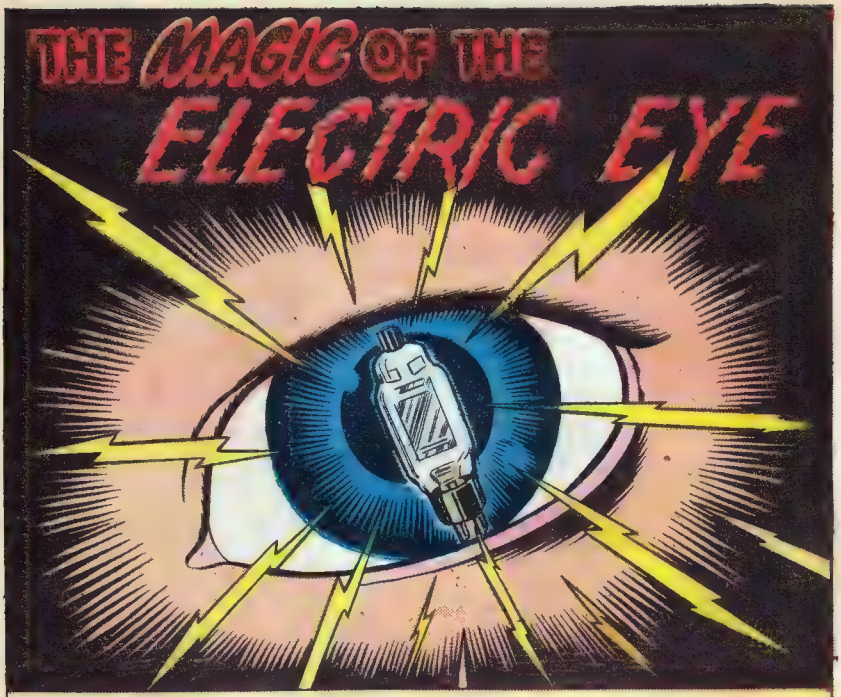


A BRICK AND A FEATHER BOTH FALL AT THE SAME RATE OF SPEED IN A VACUUM! THIS IS BECAUSE *AIR RESISTANCE* CAN NOT SLOW DOWN THE FEATHER! THE ONLY REASON A FEATHER FALLS MORE SLOWLY THAN A HEAVY OBJECT UNDER NORMAL CIRCUMSTANCES IS BECAUSE OF AIR RESISTANCE! WEIGHT HAS NOTHING TO DO WITH IT.

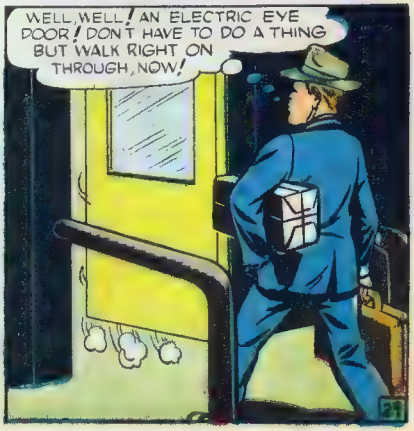
ATOM SMASHING SCIENTISTS BUILD MACHINES LIKE THE CYCLOTRON IN ORDER TO WITNESS THE DISINTEGRATION OF ATOMS, BUT YOU CAN OBSERVE ATOMS DISINTEGRATING MERELY BY LOOKING AT A LUMINOUS WATCH DIAL IN A DARKENED ROOM THROUGH A MAGNIFYING GLASS.



WHEN THE WORLD'S LARGEST OBSERVATORY (ON MT. PALOMAR, CALIF.) WAS BEGUN SEVERAL YEARS AGO, ITS MAIN PURPOSE WAS TO STUDY THE MOVEMENTS OF THE STARS...BUT WITH THE INVENTION OF THE ATOMIC BOMB, THE MAIN PURPOSE OF THE OBSERVATORY IS TO STUDY "NUCLEAR PHYSICS", THE BASIS OF ATOMIC ENERGY.



THE WHOLE, VAST FIELD OF **ELECTRONICS** RESTS UPON THE PRINCIPLE THAT ELECTRONS CAN BE PUT TO WORK BY SCIENTISTS WHO DIRECT AND CONTROL THEM BY HARNESSING THEM IN VARIOUS TYPES OF VACUUM TUBES. AS WE KNOW, ELECTRONS ARE THE TINY PARTICLES OF PURE ELECTRICITY THAT – ALONG WITH PROTONS AND NEUTRONS – MAKE UP **ATOMS**. (FOR EXPLANATION, SEE "THE BOMB THAT WON THE WAR" IN ***SCIENCE COMICS* #1**. THE FIRST VACUUM TUBE TO USE ELECTRONS TO WORK FOR MAN WAS THE **PHOTOTUBE**, KNOWN AS *"THE ELECTRIC EYE"* BECAUSE IT RESPONDS TO BEAMS OF LIGHT ELECTRICALLY. HERE ARE SOME OF IT'S USES AND HOW IT WORKS.....



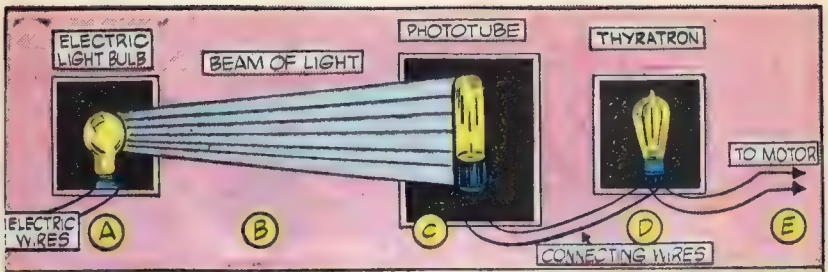
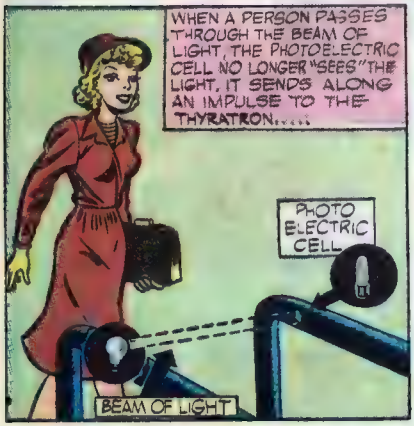
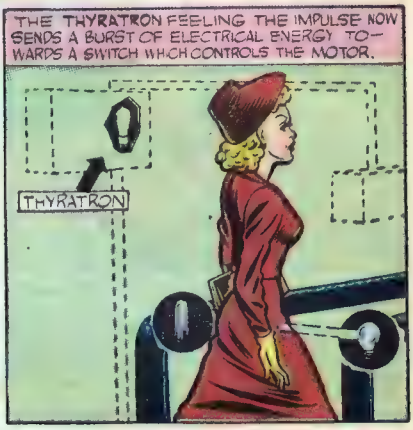
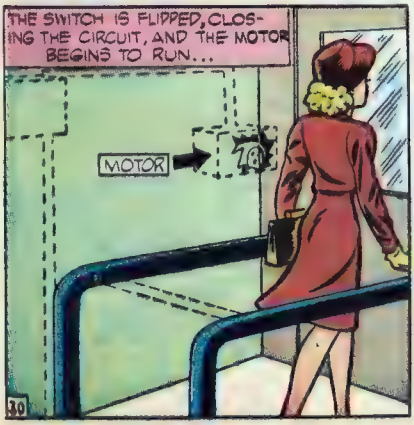
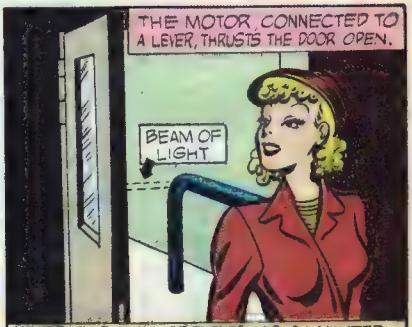


DIAGRAM ABOVE SHOWS TYPICAL - BUT HYPOTHETICAL - ARRANGEMENT OF ELECTRIC EYE MACHINATION. THE ELECTRIC LIGHT BULB (A) SENDS BEAM OF LIGHT (B) TO PHOTOELECTRIC TUBE (C) WHEN AN OBJECT INTERRUPTS THIS BEAM OF LIGHT, ELECTRONS STOP FLOWING THROUGH THE TUBE AND A MAGNETIC SWITCH IS THROWN. THIS IN TURN STARTS THE MOTOR (E) WHICH OPENS THE DOOR. ACTUALLY A PHOTOELECTRIC TUBE DOES NOT RELEASE ENOUGH ELECTRICAL ENERGY ITSELF, SO IT IS USUALLY CONNECTED TO ANOTHER TUBE CALLED THE THYRATRON (D) WHICH SENDS OUT A TREMENDOUS BURST OF ELECTRICAL ENERGY AND STARTS THE MOTOR.


WHEN A PERSON PASSES THROUGH THE BEAM OF LIGHT, THE PHOTOELECTRIC CELL NO LONGER "SEES" THE LIGHT, IT SENDS ALONG AN IMPULSE TO THE THYRATRON.....
PHOTO ELECTRIC CELL
BEAM OF LIGHT

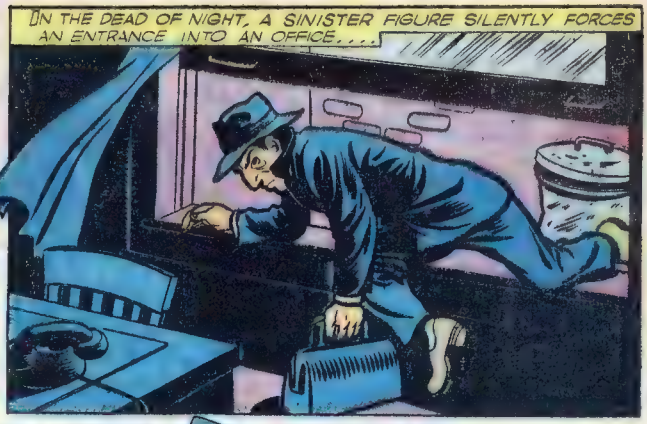

THE THYRATRON FEELING THE IMPULSE NOW SENDS A BURST OF ELECTRICAL ENERGY TOWARDS A SWITCH WHICH CONTROLS THE MOTOR.
THYRATRON

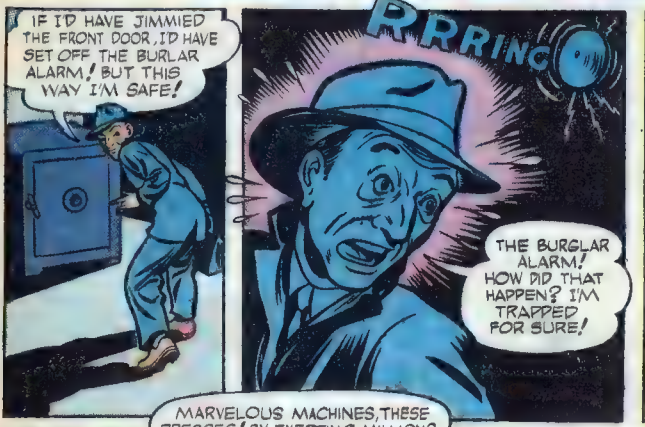




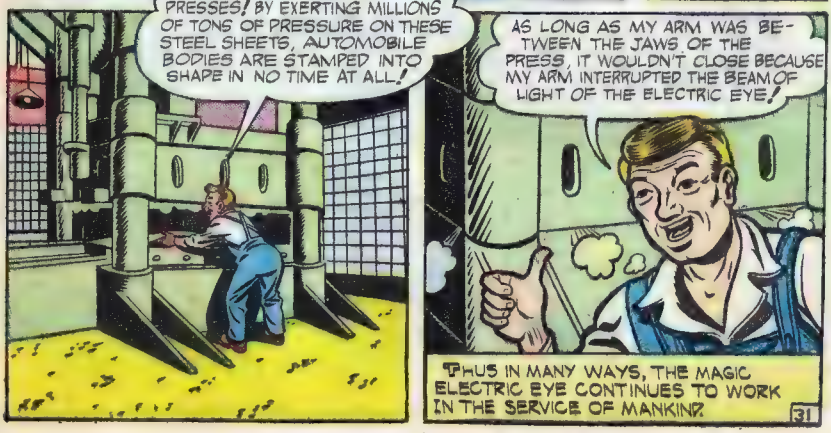
AFTER THIS CHAIN OF EVENTS HAS CULMINATED IN THE OPENING OF THE DOOR, THE MOTOR IS AUTOMATICALLY SHUT OFF, THE DOOR CLOSES AND THE MAGIC ELECTRIC EYE WAITS FOR ITS NEXT CUSTOMER TO PASS THROUGH THE BEAM.

BESIDES DOING WORK FOR US THAT WOULD OTHERWISE REQUIRE MANKIND TO USE MUSCULAR ENERGY, THE "ELECTRIC EYE" SERVES US IN A SECOND WAY. FOR EXAMPLE..



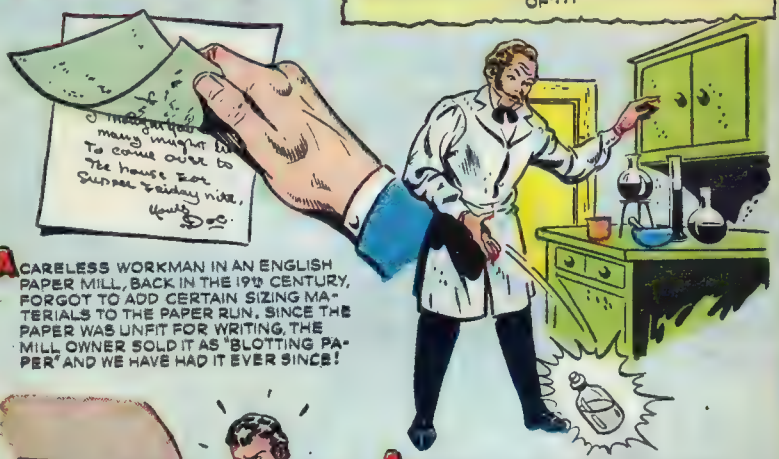

IF I'D HAVE JIMMIED THE FRONT DOOR, I'D HAVE SET OFF THE BURLAR ALARM! BUT THIS WAY I'M SAFE!
RRRING
THE BURGLAR ALARM! HOW DID THAT HAPPEN? I'M TRAPPED FOR SURE!

THE WOULD-BE BURGLAR'S BODY INTERRUPTED A TINY BEAM OF LIGHT AND THE "*ELECTRIC EYE*" SET OFF THE ALARM WHICH BROUGHT ABOUT HIS ARREST! STILL A THIRD WAY THE ELECTRIC EYE IS USED, IS IN SAFETY PRECAUTIONS, FOR INSTANCE....


MARVELOUS MACHINES, THESE PRESSES! BY EXERTING MILLIONS OF TONS OF PRESSURE ON THESE STEEL SHEETS, AUTOMOBILE BODIES ARE STAMPED INTO SHAPE IN NO TIME AT ALL!
AS LONG AS MY ARM WAS BETWEEN THE JAWS OF THE PRESS, IT WOULDN'T CLOSE BECAUSE MY ARM INTERRUPTED THE BEAM OF LIGHT OF THE ELECTRIC EYE!
THUS IN MANY WAYS, THE MAGIC ELECTRIC EYE CONTINUES TO WORK IN THE SERVICE OF MANKIND!

SCIENTIFIC SERENDIPITIES*

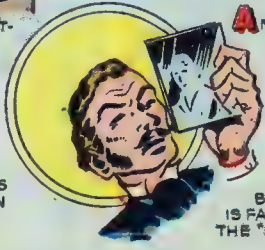
*THE WORD "SERENDIPITIES" MEANS DISCOVERIES MADE BY CHANCE OR BY ACCIDENT. IT GOES BACK TO THE DAYS OF FAIRY TALES WHEN THE THREE PRINCES OF SERENDIP ALWAYS MADE DISCOVERIES BY ACCIDENT OR BY WISDOM, OF THINGS THEY WERE NOT IN QUEST OF"...



A CARELESS WORKMAN IN AN ENGLISH PAPER MILL, BACK IN THE 19th CENTURY, FORGOT TO ADD CERTAIN SIZING MATERIALS TO THE PAPER RUN. SINCE THE PAPER WAS UNFIT FOR WRITING, THE MILL OWNER SOLD IT AS "BLOTTING PAPER" AND WE HAVE HAD IT EVER SINCE!

A FRENCHMAN, EDOUARD BENEDICTUS, ACCIDENTALLY DROPPED A GLASS BOTTLE ON HIS LABORATORY FLOOR AND NOTICED THAT IT DIDN'T SHATTER! THE BOTTLE CONTAINED A COLLOIDAL SOLUTION WHICH HAD DRIED, FORMING A 'SKIN' INSIDE THE BOTTLE. BENEDICTUS THEN CONCEIVED THE IDEA OF MAKING A SANDWICH OF TWO PIECES OF GLASS WITH NITRO-CELLULOSE BETWEEN THEM--AND THUS THE WORLD GAINED "SHATTERPROOF GLASS!"

CHARLES GOODYEAR ACCIDENTALLY SPILLED A MIXTURE OF SULPHUR AND RUBBER ONTO A HOT STOVE LID AND NOTICED THAT THE RESULTING RUBBER PATCH--ALTHOUGH SEARED ON ONE SIDE--WAS PERFECTLY PLIABLE ON THE OUTSIDE! FROM THIS ACCIDENT, HE PERFECTED THE PROCESS OF VULCANIZATION--USED IN RUBBER MANUFACTURE THROUGHOUT THE WORLD!



ANOTHER FRENCHMAN, LOUIS DAGUERRE PLACED AN UNDER EXPOSED PHOTOGRAPHIC PLATE IN A CLOSET WHERE HE HAD LEFT A SAUCER OF MERCURY! THE MERCURY VAPORIZED AND BROUGHT OUT THE IMAGE SO CLEARLY THAT MODERN COMMERCIAL PHOTOGRAPHY WAS BORN. THIS TYPE OF PICTURE IS FAMILIARLY KNOWN TODAY AS THE "DAGUERREOTYPE"!

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